

**Testimony of Mark Maddox  
Acting Assistant Secretary  
Fossil Energy  
Before the  
Subcommittee on Energy  
Committee on Science  
U.S. House of Representatives**

**March 24, 2004**

**Introduction**

Mr. Chairman, Members of the Subcommittee, it is a pleasure to join you today to present the Office of Fossil Energy's FY 2005 budget submission and to focus on the details that fall under the purview of this Subcommittee. The Department appreciates the support of the Chairman and the Members of the Subcommittee over the past years and I look forward to working with you on budget issues related to the Fossil Energy Program.

**The Office of Fossil Energy**

Mr. Chairman, as the Nation strives to break its continued reliance on imported energy sources, Fossil Energy is leading the way by seeking new energy technologies and methodologies that promote the efficient and environmentally sound production and use of fossil fuels.

The United States relies on fossil fuels for about 85 percent of the energy it consumes and forecasts indicate U.S. reliance on these fuels could exceed 87 percent in 2025.

Accordingly, a key goal of DOE's fossil energy activities is to ensure that economic benefits from moderately priced fossil fuels and a strong domestic industry that creates jobs are compatible with the public's expectation for exceptional environmental quality and reduced energy security risks. This includes promoting the development of energy systems and practices that will provide current and future generations with energy that is clean, efficient, reasonably priced, and reliable.

Fossil Energy's programs focus on supporting the President's top initiatives for energy security, clean air, climate change, and coal research. FY 2005 Fossil Energy programs:

- Support the development of lower cost, more effective pollution control technologies embodied in the President's Coal Research Initiative or help diversify the Nation's future sources of clean-burning natural gas to meet the goals of the President's Clear Skies Initiative;
- Expand the nation's technological options for reducing greenhouse gases either by increasing power plant efficiencies or by capturing and isolating these gases from the atmosphere as called for by the President's Global Climate Change Initiative;
- Or measurably add to the nation's energy security by providing a short-term emergency response, such as the Strategic Petroleum Reserve, or a longer-term alternative to imported oil, such as hydrogen and methane hydrates.

### **The President's Coal Research Initiative**

Fossil Energy's FY 2005 Budget continues to meet the President's clean coal commitment by providing \$447 million for the President's Coal Research Initiative, an increase of 40 percent or \$126.5 million over last year's request.

Under President Bush's leadership, budget requests for coal R&D have more than doubled over historical amounts and appropriations.

**Clean Coal Power Initiative and FutureGen** - Within the President's Coal Research Initiative, the Clean Coal Power Initiative (CCPI) is a key component of the National Energy Policy to address the reliability and affordability of the Nation's electricity supply, particularly from its coal-based generation. The FY 2005 Budget includes \$287 million for CCPI, of which \$237 million is for FutureGen, the world's first zero-emissions hydrogen and electricity producing power plant. FutureGen will establish the technical feasibility and economic viability of co-producing electricity and hydrogen from coal with near zero emissions, including carbon sequestration and gasification combined cycle, both integral components of the zero emissions plant of the future.

The CCPI is a cooperative, cost-shared program between the government and industry to rapidly demonstrate emerging technologies in coal-based power generation and to accelerate their commercialization. The Nation's power generators, equipment manufacturers, and coal producers help identify the most critical barriers to coal's use in the power sector. Technologies are selected with the goal of accelerating development

and deployment of coal technologies that will economically meet environmental standards, while increasing the efficiency and reliability of coal power plants.

CCPI is especially significant because it directly supports the President's Clear Skies Initiative. The first projects included an array of new cleaner and cheaper concepts for reducing sulfur dioxide, nitrogen oxides, and mercury – the three air pollutants targeted by the Clear Skies Initiative.

Since last year, the Department has made significant progress on a new generation of environmentally-clean coal technologies.

The “first round” in the Clean Coal Power Initiative – the centerpiece of the President's clean coal commitment – attracted three dozen proposals for projects totaling more than \$5 billion. In early 2003, we announced the first winners of the competition – eight projects with a total value of more than \$1.3 billion, more than one billion dollars of which would be provided by the private sector. These projects are expected to help pioneer a new generation of innovative power plant technologies that could help meet the President's Clear Skies and climate change objectives.

A competitive solicitation for the “second round” was made in early 2004 and is open to coal-based technologies capable of producing any combination of heat, fuels, chemicals, or other useful by-products in conjunction with electricity generation. Interested proposers have until June 15, 2004 to submit their proposals.

To contribute to the success of FutureGen, the President's Coal Research Initiative also includes supporting research programs in FY 2005 at a proposed level of \$160 million. It will be focused on all the key technologies needed - such as carbon sequestration membrane technologies for oxygen and hydrogen separation, advanced turbines, fuel cells, coal to hydrogen conversion, gasifier related technologies, and other technologies.

**Carbon Management** - Several Clean Coal projects also help expand the menu of options for meeting the President's climate change goal of an 18 percent reduction in greenhouse gas intensity (carbon equivalent per GDP) by 2012, primarily by boosting the efficiencies of power plants (meaning that less fuel is needed to generate electricity with a corresponding reduction in greenhouse gases).

Carbon management has become an increasingly important element of our coal research program. Carbon sequestration – the capture and permanent storage of carbon dioxide – has emerged as one of our highest priorities in the Fossil Energy research program – a priority reflected in the proposed budget of \$49 million in FY 2005.

Continuing in FY 2005, one of the cornerstones of our carbon sequestration program will be a national network of regional partnerships. This Secretarial initiative, announced last year, is bringing together the federal government, state agencies, universities, and private industry to begin determining which options for capturing and storing greenhouse gases are most practicable for specific areas of the country.

**Hydrogen** - Another aspect of the President's Clean Coal Research Initiative is the production of clean fuels from coal. Hydrogen has emerged as a major priority within the Administration and the Department of Energy as a clean fuel for tomorrow's advanced power technologies (such as fuel cells) and for future transportation systems. Within the Fossil Energy program, we have allocated \$16 million for research into new methods for making hydrogen from coal.

**Advanced Research** - To provide fundamental scientific knowledge that benefits all of our coal technology efforts, our FY 2005 Budget includes \$30.5 million for advanced research in such areas as materials, coal utilization science, analytical efforts, and support for coal research at universities (including historically black and other minority institutions).

**Other Power Systems Research and Development** - We are also proposing \$23 million for continued development of fuel cells with an emphasis on lower-cost technologies that can contribute to both Clear Skies emission reductions, particularly in distributed generation applications, and Climate Change goals by providing an ultra-high efficiency electricity-generating component for tomorrow's power plants. Distributed power systems, such as fuel cells, also can contribute to the overall reliability of electricity supplies in the United States and help strengthen the security of our energy infrastructure.

**Natural Gas Research** - The President's Clear Skies Initiative also provides the rationale for much of the Department's \$26.0 million budget request for natural gas research. Even in the absence of new environmental requirements, natural gas use in the United States is likely to increase by 50 percent by 2020.

Our natural gas research program, therefore, is directed primarily at providing new tools and technologies that producers can use to diversify future supplies of gas. Assessment of the natural gas program under the Program Assessment Rating Tool (PART) found that the program often duplicated private sector R & D, and that the program lacks a rigorous peer review process. As a result the program is being re-focused on areas where there is little private sector effort, or that are long-term, high risk. Emphasis will be increased on research that can improve access to onshore public lands, especially in the Rocky Mountain region where much of our undiscovered gas resource is located. A particularly important aspect of this research will be to develop innovative ways to recover this resource while continuing to protect the environmental quality of these areas.

Natural gas storage will also assume increasing significance in the United States as more and more power plants require consistent, year-round supplies of natural gas. Toward this end, we will initiate a nationwide, industry-led consortium that will examine ways to improve the reliability and efficiency of our nation's gas storage system and explore opportunities for LNG facility siting.

Over the long-term, the production of natural gas from hydrates could have major energy security implications. Hydrates are natural gas-bearing, ice-like formations in Alaska and offshore.

U.S. Geological Survey estimates indicate U.S. gas hydrates resources are larger by several orders of magnitude than previously thought and dwarf the estimated 1,400 trillion cubic feet of conventional recovered gas resources and reserves in the United States.

This huge resource warrants a new look at advanced technologies that might one day reliably and cost-effectively detect and produce natural gas from methane hydrates. Hydrate production, if it can be proved technically and economically feasible, has the potential to shift the world energy balance away from the Middle East. Understanding hydrates can also improve our knowledge of the science of greenhouse gases and possibly offer future mechanisms for sequestering carbon dioxide. For these reasons, we are continuing a research program to study gas hydrates with a proposed funding level of \$6.0 million.

### **Oil Technology Development**

The President's National Energy Policy (NEP) calls attention to the continued need to strengthen our nation's energy security by promoting enhanced oil (and gas) recovery and improving oil (and gas) exploration technology through continued partnerships with public and private entities.

At the same time, however, we recognize, as supported by evaluation under the Program Assessment Rating Tool (PART), that if the Federal oil technology R&D program is to produce beneficial results and not duplicate private sector efforts, it must be more tightly focused than in prior years. Consequently, our FY 2005 Budget request of \$15.0 million reflects a reorientation of the program toward those areas where there is clearly a national benefit.

One example is the use of carbon dioxide (CO<sub>2</sub>) injection to enhance the recovery of oil from existing fields. CO<sub>2</sub> injection is a proven enhanced oil recovery practice that prolongs the life of some mature fields, but the private sector has not applied this technique to its fullest potential due to insufficient supplies of economical CO<sub>2</sub>. A key Federal role to be carried out in our proposed FY 2005 program will be to facilitate the greater use of this oil recovery process by integrating it with CO<sub>2</sub> captured and delivered from fossil fuel power plants.

We will also refocus much of our Oil Technology program on a new Domestic Resource Conservation effort that will target partnerships with industry and universities to sustain access to marginal wells and reservoirs. These aging fields account for 40 percent of our domestic production and contain billions of barrels of oil that might still be recovered with ever-improving technology.

A high priority effort in FY 2005 will be to develop “micro-hole” technology. Rather than developing just another new drilling tool, the Federal program will integrate “smart” drilling systems, advanced imaging, and enhanced recovery technologies into a complete exploration and production system. Micro-hole systems may offer one of our best opportunities for keeping marginal fields active because the smaller-diameter wells can significantly reduce exploration costs and make new drilling between existing wells (“infill” drilling) more affordable.

Using breakthrough technology like this to keep marginal fields in production preserves the opportunity to eventually apply even more advanced innovations that could recover even larger quantities of domestic crude that traditional oil recovery methods currently leave behind.

### **Other Fossil Energy Activities**

Our budget also includes \$124.8 million for other activities in our Fossil Energy program, including \$106.0 million for headquarters and field office salaries, \$6.0 million for environmental restoration, \$3.0 million for Federal matching funds for cooperative research and development projects at the University of North Dakota and the Western Research Institute, \$1.8 million for natural gas import/export responsibilities, and \$8 million for advanced metallurgical research at our Albany Research Center.

## **Petroleum Reserves**

The Office of Fossil Energy is also responsible for our nation's petroleum reserves. Our FY 2005 Budget includes \$ 172.1 million for the Strategic Petroleum Reserve, \$ 5 million for the Northeast Home Heating Oil Reserve, and \$ 20 million for the Naval Petroleum and Oil shale Reserves.

## **Closing**

Mr. Chairman, as I stated at the outset, Fossil Energy's programs are structured to promote the development of energy systems and practices that will provide current and future generations with energy that is clean, efficient, reasonably priced, and reliable. And our focus is on supporting the President's top initiatives for energy security, clean air, climate change, and coal research. Accordingly, I believe our FY 2005 budget submission meets these critical needs for energy, environmental and national security at a difficult time in our history.

Mr. Chairman, and members of the Subcommittee, this completes my prepared statement.

I would be happy to answer any questions you may have at this time.